Long Range Planning 2002-2007—Technology at SIU Carbondale
January 2002

INTRODUCTION

In spring, 2001, the Computing Advisory Committee (CAC) formed a subcommittee, with members appointed by the Deans, to create a "Long Range Academic Technology/Issues Plan." The previous CAC plan was issued in April of 1998 and most of the goals outlined in that plan have been accomplished. The current plan is for a five-year period and it will be reviewed annually to monitor new technologies and to integrate it with SIUC's new strategic plan that is currently being developed.

The subcommittee members are: Don Olson, Information Technology, Chair; Ruth Bernhardt, AIS; Philip Chu, Mechanical Engineering; J.P. Dunn, Library Affairs; Bruce Fisher, College of Business; Robert Jensen, Psychology; Brian Kearney, Information Management Systems; Andrew Lumpe, Curriculum and Instruction; Claudia McIntyre, School of Medicine; Mary Rudasill, School of Law; Dick Steffen, College of Agriculture; James Tyrrell, Chemistry and Biochemistry; Chandrasekhar Vallath, Mass Communications and Media Arts. Appendix A contains a list of background material circulated to the subcommittee during the summer of 2001.

This committee polled many faculty members and administrators to obtain information from a variety of constituencies and viewpoints. This document is a consensus report from the committee. Even though there was a wide range of input, similar issues of support and computer replacement emerged as recurring themes as well as a general recognition of the importance of keeping the local area network "state of the art."

Consultant Peter Drucker said, "Every few hundred years throughout Western history, a sharp transformation has occurred. In a matter of decades, society altogether rearranges itself – its worldview, its social and political structures, its arts, and its key institutions. Fifty years later, a new world exists. Our age is such a period of transformation." If we follow this philosophy, the key to the transformation is information, access to information and the technology involved in the distribution the information.

We do not know for sure what new technologies will appear in the future but we must plan based on what we know of current technologies and where they are likely to take us. At the same time we must be prepared for new breakthroughs such as the way the WWW has transformed information distribution in the past six years. Technology expertise and innovative applications are not located in one department but spread throughout the University; however, a strong and responsive technology infrastructure is required to support our students, administrative support, the academic departments, in short, the University as a whole.

OVERVIEW

Many of the following areas have similar needs. Major issues in each of these areas are:

Administrative Systems – The AIS project will need continual development and financial support for the foreseeable future. The Student Information System will remain as is for the next few years with the addition of more Web interfaces to benefit students, faculty and staff.

Networks – The data network is a good, reliable, state-of-the art network. Funds need to be identified to insure adequate maintenance of the network, currently costing $201,000 a year, as well as to provide for future upgrades when the technology changes. The entire campus will likely become wireless during the next five years. This will require an investment of over one million dollars. However, a growth in wireless capabilities does not eliminate the need for our current wired network.

Network and Computer Security – After September 11, security has become a national priority. Given administrative approval, Information Technology can currently perform security assessment and audits on departmental servers, but to meet all the goals listed below, additional staff will be needed. Campus-wide authentication and authorization infrastructures are being established, but they will have to be replicated on departmental servers to be totally effective.

Technology Training and User Support – Assisting faculty to integrate Information Technology into instruction is the Information Technology issue of single most concern to campuses according to "Campus Computing 2001," the 12th National Survey of Computing and Information Technology in Higher Education. If there is a goal to increase the use of technology to increase the quality, adequate support positions need to be created. The same survey reports user support ratios, a ratio of the number students per central IT support staff (User Support Ratio). Research universities average 180:1. To reach this level of support at SIUC, an additional 40 positions will need to be created for distributed, central IT, and Academic Technology Center support.

Technology in Teaching/Training and Distance Education – Administration and faculty will need to cooperate to define the role of Distance Education at SIUC. Issues to be resolved include provisions of the IEA/NEA faculty contract and what limitations this contract might impose. Additional questions include which unit is assigned the credit hours for a Distance Education course, and the ownership of the instructional material.

Research – The key concerns of the faculty are: to be able to communicate effectively in a variety of ways from their current location to other sites both inside and outside of the campus; to have hardware and software appropriate to their needs; and to have support for training in the use of and maintenance of the hardware and software.

Faculty/Staff Desktop Computer Funding – The University does not have a centralized funding mechanism to replace faculty and staff computers on a regular basis. The ongoing cost to do this would be $2,564,000 annually, assuming a three-year replacement cycle.

DETAILED DISCUSSION

Administrative Systems

The need for administrative information is greater than ever. When fully implemented, the AIS (Oracle) Project will handle financials, human resources and grants management. Implementation has been a slow frustrating process, but the system will provide accurate information easily when fully operational. In retrospect, SIU tried to implement AIS on a shoestring as compared to other institutions of our size and complexity. Many other universities have spent as much or more to implement a single module than SIU spent on both financial and human resources modules. It has also resulted in a lengthy implementation process. The continuing need to perform the job requirements for the old system and spend time on AIS concurrently has caused user dissatisfaction. Continued long-term support for the AIS project is needed.

The Student Information System (SIS) has been in use for a number of years. An IBM mainframe was upgraded recently to support the SIS system for the next few years. The upgrade provides a large enough platform to permit migration to a new SIS when needed. In the meantime, more Web interfaces such as those used for registration are being implemented. The SIS system is currently owned and maintained by SCT and it has a large user-base including the University of Kentucky, New York University, University of North Carolina, Kansas State University, and the University of Colorado to name a few. The current SIS system will not last indefinitely, but the strategy of almost all the SIS users is to wait a few years to see what the replacement system (RLS), being developed by SCT, will be like. If the new system is viable, as we are SCT customers, migration to the RLS system will be easier and less expensive than any other option. SCT has stated that the new system's equivalent components (SIS for us) will not cost current customers anything beyond our normal maintenance cost. The new RLS version of SIS is expected to go live at the above-mentioned universities in 2005-2006 timeframe.

The need for the establishment of a "data warehouse," a database containing historical information on all the administrative systems, is another expensive proposition, but this too will be needed to enable the use of historical information for proper institutional planning.

Networks

A good, reliable, fast network is the infrastructure that holds everything together. The fiber optic cables already in the ground on campus will last for many years, and most of the wire in the buildings will probably last a long time too. The electronics connecting everything together, however, have a limited life and recurring funds need to be budgeted to ensure regular replacement at least every five years. Further, network data

requirements increase by a factor of ten every few years. Ten years ago, ten Million Bits per Second (10MB) Ethernet was the standard for network performance; however this has recently increased to 100MB and within the last few years, even to Gigabit (billion bit) Ethernet. Gigabit, currently in the process of being installed at SIU, will need to be upgraded in a few years when network technologies provide faster bandwidth. Messaging systems, web services, data base resources, and other systems will need to be upgraded to take advantage of improved network capabilities. Voice, video and data are converging and supporting one network for all three is easier than supporting three specialized networks. There is no existing budget plan for normal growth, replacement and ongoing maintenance of networking equipment. The current annual maintenance costs for the gigabit data network is $201,000. This expense should become a part of SIUC's annual budget. The possibility of a network access fee to support maintenance and development will need to be discussed.

We currently have over 9,000 telephones in use at SIUC. Long distance revenues have historically supported the costs of telephone network infrastructure and the continual upgrades that are needed. However, long distance revenues are declining rapidly and SIU (as are all major phone companies) is struggling with the need to maintain revenue in the face of decreasing long distance rates. The old switched circuits long distance lines of the telephone companies are being converted to voice over IP (data networks), and we will need to position ourselves to take advantage of this new technology or risk falling behind other universities in terms of cost containment and functionality. Both the school of Medicine in Springfield and SIUE are positioned to upgrade to voice over IP.

In addition to the wired campus, wireless networking is certain to increase from the four buildings that offer wireless today. In the near future, the entire campus will have wireless capability. Standards and guidelines for installation of wireless networks exist. The student with a laptop, a cellular phone, or a Personal Digital Assistant (PDA) will be able to send and receive email, access the Internet, and have a voice conversation from any location on campus. It is anticipated that these devices will continue to converge and become smaller and less expensive. At a few hundred dollars per device, every student could have one. However, growth in wireless communications does not eliminate the need for a continuing investment in fiber optic cables and wire.

Network and Computer Security

The computing resource environment at SIUC is ubiquitous and diverse. The benefits of electronic information and communication come with accompanying risk. Unfortunately, information can be intercepted while crossing the network and access to administrative systems can be compromised and used for illegal purposes. A hacker from the other side of the world (or the lab next door) can compromise a computer and the information on it.

Often, networks grow from several separate networks to multiple connected networks. Security for portions of the network is often left to individual network administrators,

faculty, staff, or students in the various departments and colleges. Some of these individuals know and understand the need for security while others do not understand the need or recognize the necessity for security, even within a university environment.

Federal officials have found that the computers most likely to be used in terrorist cyber attacks have been computers in research facilities in American universities. Other considerations that create security problems for the University include the following:

1. The federal government is considering withholding funding for grants unless universities can prove that they are meeting specific standards in regard to security.
2. Our computer labs are open to the general university population and access is granted based on student or staff status.
3. The university libraries have public access computers where access is open to both the university population and to the community at large.
4. Many of the faculty, staff and students who are setting up distance learning environments are not familiar with security issues associated with maintaining secure sites.
5. Tools for compromising our computer systems are readily available via the World Wide Web.
6. User-ids and passwords can be sent "in the clear" over the campus network.
7. The increasing use of wireless networking poses additional security concerns.

Periodic security assessments and audits should be performed for the entire SIUC network in order to achieve a safe and secure learning environment for faculty, staff and students. The purpose of conducting a security assessment would be to locate specific security vulnerabilities and make specific recommendations on how to secure those systems. Security assessment and audits should require written administrative permission prior to performing tests. In addition, they should create a network map diagramming the various nodes of the network, identify potential threats and vulnerabilities, and result in assessment reports highlighting the vulnerabilities and providing instructions and suggestions concerning how to protect the systems.

The University should adopt policies and procedures that define the security responsibilities of both the users and the people who maintain computers and networks. Security policies should be established that specifically identify what must be done to protect information stored on computers. Procedures need to be developed that will enable effective security policies to become a reality.

The campus should establish a task force comprised of representatives from different populations of the University community to develop security policies. It is crucial to gain the approval and support of University administrators; otherwise the ability to implement security policies will be severely curtailed. Implementation of security policies and procedures can be tackled with a multi-pronged approach including an education and awareness campaign, development of implementation recommendations

and specifications, on-going training opportunities for technical support staff, monitoring and tracking of incidents, and continual review and modification of policies.

Information Technology has one security administrator to manage security issues and assist departments with education, training, and incident prevention, detection, and response. With administrative approval, much of the above can be accomplished; however, one administrator is not sufficient to implement all the security measures recommended. An annual operating budget sufficient to cover salaries and incidental costs plus funding for hardware and software for monitoring the campus network to detect and reduce "attacks" should be established.

Coherent, campus-wide strong authentication and authorization infrastructures are currently being established. This will include a central, comprehensive campus authentication, authorization, and directory services infrastructure. Virtual Private Networks (VPNs) and other similar technologies that protect privacy, access to resources and sensitive data need to be standardized and implemented on both wired and wireless, networks.

Technology Training and User Support

As noted above, assisting faculty with the integration of information technology into instruction is the single most important Information Technology issue. The Academic Technology Center partnered the skills and resources of Information Technology and Library Affairs to create a cohesive, highly focused team capable of providing "one-stop shopping" to faculty seeking support for instructional technology initiatives. Although the Library and Information Technology are dedicated to providing the best possible services with the resources available, it was clear from the start that a comprehensive academic computing facility for a campus of this size will require additional investments in staff, training, and resources by the University administration.

The mission of this partnership is to provide faculty with effective support for teaching and learning initiatives in the classroom and in distance learning technology. This mission can further be divided into three goals:

1. To develop a seamless and equal partnership between Information Technology and Library Affairs, so that customers are unaware of the organizational differences or complexities;
2. To set the trend for instructional technology for SIUC; and
3. To improve high-quality instructional technology development and support for campus faculty.

The following are some potential new initiatives for this partnership. Some will be provided without additional staff resources, and some will require increases in staff levels, training and equipment.

1. Campus Needs Assessment – It is important that the Academic Technology Center (ATC) stay in sync with the needs of the campus as well as with the "best practices" of academic technology across the nation. We need to develop an ongoing program to assess the needs of faculty and academic programs and to determine how technology can be brought to bear on the problems, opportunities, and initiatives that arise. The form of the assessment may be surveys, focus groups, contacts with key individuals or brown bag discussions, or some combination thereof.
2. Brown Bag Discussions – Hosted by the ATC, various interest groups could be invited to discuss their needs and the ATC staff could provide information and instruction on academic technology issues. One of the first brown bag discussions proposed is a "how to" workshop on virus protection for LAN administrators and local support providers.
3. Additional Workshops – The campus community has greeted the ATC workshops with enthusiasm and appreciation. Many workshop participants have expressed an interest in advanced workshops on Office products such as Word, Access, Excel, etc.
4. Workshop Outreach Program – Information Technology has already presented a few workshops to particular student groups and campus departments. As the campus becomes more aware of these offerings, more requests are expected for special workshops and presentations.
5. Self-Instruction Courses – Workshops that have already been developed could be reworked into self-instruction courses developed in WebCT or other such authoring tools.
6. Awards Program – In order to encourage the use of technology in instruction, the University could begin a recognition program showcasing the innovative use of technology in instruction by faculty members.
7. Gallery of Courses – A gallery of courses could be developed to showcase instructional materials and courses contributed to by innovative faculty members to inspire others to create courses that would follow those models.
8. Integration of WebCT – Pinnacle Corporation is developing an interface between WebCT and the Student Information System. If we were to partner with Pinnacle, we could influence the design of this interface and become an early adopter of the integration product. This would permit the exchange of information between SIS and WebCT courses.
9. Other Partnerships – The ATC could explore other campus partnerships that would provide a focused approach to academic technology on campus.
10. Toolkits – The ATC could develop templates, development aids and other software tools and documentation that would speed the development of online courses and the use of technology in the learning process.

Maintaining pre-partnership levels of service requires significant staff commitments and limits the capacity to take on new initiatives such as those outlined above. To move beyond the current agenda will require an investment in new staff, retooling existing staff, and additional equipment.

Students, civil service staff, A/P staff, and faculty differ widely in their degree of sophistication in the use of desktop computers, the associated peripherals, software beyond word processing, and network resources. Whether proficient in the use of technology or not, it is clear that most users have learned to use these resources through informal paths or they are self-taught. Often in an academic unit, one or more "gurus" informally consult on technology and assist faculty, staff, and occasionally students in becoming more proficient in the use of new technologies. These "gurus" are hugely valuable to the University, but their *ad hoc* consulting work takes them away from their assigned jobs and it is likely, for some at least, that their overall effectiveness is compromised by their consulting activities. Many times these "gurus" feel isolated. One dean pointed out that there are real costs associated with the lack of personnel specifically trained and assigned to assist users.

Some faculty are experiencing difficulty in using technology to assist in classroom instruction. Although the rudiments of presentation software are fairly easy to learn, tasks such as importing graphics, charts, and animations are more challenging and, without help, not easy to accomplish the first time. Morris Library provides a laboratory where instructors may receive one-to-one assistance and instruction in the use of common software and peripherals. In addition, the Academic Technology Center has the expertise to assist faculty with instructional design; creating web pages, web courses, multimedia presentations, graphics and video; and presentations, and other software packages.

The enhancement of user skills is an issue that needs to be addressed. The Academic Technology Center has a long-standing program of offering short tutorials on technology use. These tutorials are generally viewed as being of high quality and it is felt that they should be continued with special efforts to enhance awareness of them. The Library has a teaching laboratory for faculty and staff. Many faculty are unaware of this service.

There is currently little unanimity as to how user support should be enhanced. In several academic units, there are staff members already available to assist users in tasks such as the establishment of network connections and the removal of viruses. For other academic units, the resources to provide adequate user support simply do not exist. It is, however generally recognized that there are many technology-related problems that require hands-on attention. Two possible solutions are suggested here.

While having certain services and resources centralized makes sense, most of the faculty feels a need for having more local resources available. This could be at the college, department, or program level. The solutions proposed by many of the colleges revolve around finding resident faculty "experts." While this method is useful, relying solely on this method would make it difficult to sustain the long-term commitment it takes to develop curriculum utilizing new instructional technologies.

Provide funding for an Educational Technology Coordinator within each college. This person would be responsible for coordinating all of the educational technology

resources and maximizing communication between all of the participating academic departments supporting departments.

Form an Educational Technology Planning Committee for each College. Many colleges already have a similar committee. This committee would make recommendations and assist with processes required to make the most of all the resources available to the departments within the college and provide a line of communication to SIUC's administration. In addition, the members could help create policies and procedures to determine how money should be spent, set priorities, identify training and technical support needs, and be advocates for the department at the college, university, or state level in regard to implementing educational technology strategies.

Develop Educational Technology Support Teams within the colleges. Team members could be at the college, department, or program level depending on the needs of the individual colleges. The overall goal of the teams would be to assist faculty in developing and delivering multimedia materials. These materials and methods could be used for regular, distance learning, and virtual classrooms. Each program could be treated as a client needing services to accomplish specific learning outcomes and having a unique set of resources and expertise. The teams could include: Educational Technology Coordinator; Technical Support Group supervised IT staff; Instructional Technologist; Faculty assigned to assist other faculty; and Faculty course instructors.

A second, somewhat different approach is also suggested. In this option, the Office of Information Technology would establish and train an expanded corps of technicians that could make "house calls" to assist faculty and staff. Some of these individuals could be student workers, graduate assistants, and some should be full-time professional staff. The full-time personnel would be responsible for training the students and supervising their work. The number of technicians ought to be sufficient to permit same-day responses to most requests for assistance.

If there is a goal to increase the use of technology to increase the quality of instruction on campus, then adequate support positions need to be created. As noted earlier the Kenneth Green report, *The Campus Computing Project 2001*, compares the number of students per central IT support staff (User Support Ratio). Research universities generally average 180:1. To reach this level of support, an additional 40 positions will have to be created for distributed central Information Technology and Academic Technology Center support.

Many variations of the above two options are available and the Computing Advisory Committee will be discussing them and exploring alternatives to these problems that have been adopted at other research institutions.

Technology in Teaching/Learning and Distance Education

Perhaps the greatest ability to affect change and transformation is in the teaching/learning area. This is the transformation that Peter Drucker cites. In informal

questions to the incoming SIUC freshman, around 80 percent of the students had a computer by the time fall semester, 2001 begins. According to Merrill Lynch's report, *The Knowledge Web*, students spend nearly 19 hours a week on the Internet, 84 percent of the time pursuing academic activities. Students now entering college have grown up with computers and, as a result, consider the computer a necessary tool, not a revolutionary technology.

Distance Education uses technology to provide students easy access to class notes, reference materials, and uncomplicated electronic discussions between faculty and students and among students. Studies have shown that these techniques add value to the class. How soon will it be before students demand these same capabilities in every course they take?

It is up to the administration and faculty to set goals and objectives for the University. Whatever the role of technology in teaching/learning will have at SIU there are a number of issues that need to be resolved so that we can move forward.

What are faculty incentives for integrating technology or teaching a distance education course? For example, the University of Illinois allows a one-course reduction the semester before the course is taught for development time. The first time the course is taught, there is another one course reduction. After that, it is taught as a normal in-load course. Other universities have developed policies that provide for paid overload or have summer stipends to develop a course. SIU has experimented with the latter plan in limited ways, but there have been occasional problems with the results.

The provisions of the IEA/NEA faculty contract may impose some limitations on any faculty involvement in the use of technology is another area of concern, especially with regard to faculty teaching load, and certainly the lack of settled policy in this area is a stumbling block. The assignment of section numbers to Distance Education (DE) classes, who does it, and the decision rules for how it is done all affect the assignment of FTE credit and may impact faculty pay. Finally, the issue individual faculty contractual documents such as changes of assignment and continuing education contracts, and so forth, as well as the nature of the policies used in the completion of those documents all will potentially affect faculty pay for distance learning courses. Once distance education course are developed, there will be the question of the source of funds for faculty salaries to teach them and decisions will need to be made whether faculty pay will this vary for on and off campus students enrolled in a particular course. These issues will need to be carefully addressed during contract negotiations so that an equitable solution can be developed that encourages members of the faculty to participate fully in distance education.

Another issue is which unit gets the credit hours for a Distance Education course. One SIU department chair noted that within a year, his department could have ten courses on-line with a thousand students enrolled. Unless his department gets FTE credit for the courses, however, there really is no incentive to develop the program, which would increase SIU total enrollment.

Ownership of the course materials is another question that has to be resolved. That is, who owns the course after it is developed, the University or the faculty member? Some universities claim ownership if the course is developed on university time using university equipment and technical support help. A compromise solution of giving the faculty member, if he/she leaves, rights to the course and derivative copies while retaining the rights of the university to use the course and make derivative copies. Some faculty members have wanted to market a course and teach it at another institution, such as a for-profit university. These cases have often been discouraged.

As more faculty use technology in regular classroom situations, how much technical support needs to be supplied? Course management systems like WebCT enhance the offerings, but take time to learn and implement. This issue, discussed earlier, remains a concern.

Research

The key concerns of faculty are:

1. to be able to communicate effectively in a variety of ways from their current location to other sites both inside and outside of campus;
2. to have hardware and software appropriate to their needs; and
3. to have support for training and maintenance of the hardware and software.

For many researchers on campus connectivity is all-important. Issues concerning connectivity may take the form of speed of access for the transfer of very large data packets, for real-time interactivity with colleagues, the quality of equipment at remote sites, and the capabilities for video-conferencing. Our connection to Internet2 is a major step in accommodating these needs. However there is a definite need to more aggressively encourage the use of Internet2 by researchers. This can be done through providing more information as to how it can be used to enhance their research efforts, through identifying which activities can most appropriately benefit from this level of access, and most basically, how to get started. A factor affecting connectivity is the nature of the quality of the connection all the way from the computer to the wall outlet and through the building LAN to the Campus LAN connection. Any weak link in this chain impacts the effectiveness of the connection and needs to be addressed if the researcher is to achieve optimum levels of connectivity. An issue of increasing concern to researchers is video-conferencing. We can expect a substantial increase in this means of communication.

For many researchers availability of hardware is still the major issue. The University has been discussing the need for a replacement strategy long enough – it is time to implement a plan. Implementation can be staggered to spread costs over a 3-4 year cycle. While some researchers will need state-of-the-art hardware they are also more likely to be recipients of external funding which can supply those needs. A replacement strategy should focus on standard systems not high-end or exotic systems. It must be recognized however that such a replacement plan should not be limited to desktop

computers, but should also include mobile devices as well as peripherals such as printers, scanners, and imaging .

Software is also of concern to faculty and ranges from word-processing, image processing and web development software common to almost all researchers to more specialized statistical packages, mathematical packages, modeling software and CAD systems. The University cannot provide licensing agreements for the more specialized packages but it can substantially expand its current efforts given sufficient funding. Current licensing agreements include Microsoft Office and certain statistical packages. There is certainly room for identifying and licensing image processing and web development software and possibly certain mathematical and CAD packages. These licensing agreements should include upgrade provisions.

Enhanced training and support are badly needed. To require faculty to resolve their own hardware problems, virus infections or software glitches wastes a great deal of valuable time. Often this is done in isolation or with the aid of a local "expert" who may be only a step ahead of the person being helped. While a few departments or colleges have support staff, they are usually stretched very thin and are severely limited on the types of problems they can address. Training is probably on the bottom of their list of things to do. However this will require those units to more effectively reassess their needs and priorities than has been done in the past. A complicating issue is the inflexibility and outdated nature of the Civil Service classification system. To the extent that departments such as Computer Science, Electrical and Computer Engineering, and Information Systems Technologies in ASA could develop internship requirements for their majors, these students could serve in support roles and the University would gain a valuable additional source of technical expertise.

Faculty/Staff Computer Funding

SIU has a student technology fee, but the fee is not adequate to provide funds to replace all current lab computers on a three-year cycle. Despite more students owning their own computers, the labs are busier than ever. When students are on campus they want access to computers and specialized software. The technology fee should be increased to provide funds for periodic computer and software replacement and to provide for the establishment of new specialized labs.

The university, in general, has no plan in place to replace faculty/staff computers on a regular basis. The university budget process should be adjusted to include computer replacement using central funds. A three-year replacement cycle is desired. Better asset management will emerge from this program as well as more consistent PC maintenance support.

SIUC has an estimated 7,000 personal computers. Student labs with 1,400 micros are not considered, as the student tech fee is intended to fund them.

Approximate costs, replacing one third of the computers each year with a three-year payment is:

	Cumulative No. of PCs	Cumulative Cost	Cumulative No. of Macs	Cumulative Cost
Year 1	1817	$855,000	50	$22,800
Year 2	3633	$1,710,000	100	$45,000
Year 3	5450	$2,564,000	150	$68,400

CONCLUSIONS

It cannot fail to be noticed that in every section of this plan there is a call for additional resources. In a time of severe budget constraints there are many important constituencies, including Information Technologies, competing for scarce resources. Not all needs can be met. However, the campus needs to have a serious discussion about its priorities so that a general consensus can be reached concerning the relative importance of computing and network technologies to the mission of the university.

It is quite clear that current administrative and student information systems will continue to develop as anticipated. They are essential parts of the day-to-day operations of the university. Further, the campus wiring network is in good shape, but regular plans need to be developed to keep it current, and additional funding will be needed to install the increasingly inevitable wireless facilities that will be the wave of the future. One concern is the question of computer security. Here, considerable work needs to be done to enhance security on campus. These task range from spreading the concern about security to everyone whose access might constitute a point of vulnerability to the installation of a secure single sign-on that will not only keep intruders out but permit those with access to accomplish their tasks.

A significant investment will need to be made in technical support for users because, while the current Customer Support Center is already doing a good job, it is significantly understaffed, relative to other universities, for the size of the SIUC user community. In addition, there needs to be increased attention paid to training in the use of information technology, not only for students, but also for faculty and staff.
There are a number of important policy issues related to web-based distance learning that need to be addressed. Some will be covered in the contract with the Faculty Association, while others are general policy questions that will need to be dealt with at the campus or even university level.

The research needs of the University are in general being met, but there needs to be assurance of high-quality connectivity for those who need it. SIU has a wonderful opportunity that comes from its position as an Internet2 institution. However, this new capacity needs to be better publicized and used by a wider range of people.

Finally, there must be a plan for regular replacement of desktop computers., The purchase of this new equipment needs to be funded in a reliable way from year to year to ensure that those with state of the art computers today will not be left behind three years hence. Although some of the recommendations summarized above and discussed at greater length in the body of the report will require significant expenditures, and current budget problems make the allocation of any new funds very difficult, SIUC must continue to make investments in technology if it is to remain competitive in the twenty-first century market. Our students must be prepared to enter a technologically sophisticated job market and our faculty must have the technological base to compete effectively with scholars from other institutions around the world.

APPENDIX A

Reference Material

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